

the group is lost in the halation circles which surround each of the bright stars, and none of the distant nebulosity is shown. I counted on four square degrees, with η in the centre, 825 stars as against 953 on the 5-inch lens plate, and 3,470 stars on the reflector plate; the exposure of the two last named being $2^h 50^m$ against 4^h with the Willard lens.

The plate exposed during $10\frac{1}{2}$ hours shows only 1,385 stars on 2° by 2° , whilst the same area on the 4^h plate has 1,259 stars; therefore the difference in photo-effect upon the two plates is less than that of one stellar magnitude. This fact throws some doubt upon the reality of the distant nebulosity which is shown on the plate; and when we consider that the whole patch, that covers the group of the *Pleiades*, is due to halation, and not to nebulosity, the doubt is further strengthened.

The star images on this photograph are double and overlap; the exposures of the plate, therefore, were effectively of less than $10\frac{1}{2}$ hours' duration.

Photograph of the "Owl" Nebula M 97 and of the Nebula H V 46 Ursæ Majoris. By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebula M 97, R.A. $11^h 8^m 42^s$, Decl. $55^\circ 36'$ (epoch 1895), and of H V 46, R.A. $11^h 5^m 22^s$, Decl. $56^\circ 15'$ north, was taken with the 20-inch reflector on 1895 April 20, with an exposure of the plate during four hours, and the copy now presented is enlarged to the scale of 1 millimetre to 15 seconds of arc.

The nebula M 97 is N.G.C. No. 3587, G.C. No. 2343, *h* 838. Rosse, *Obs. of Neb. and Cl. of Stars*, p. 93, and *Phil. Trans.* 1850, Pl. XXXVII. fig. 11.

Sir J. Herschel (G.C. 2343) describes it as a very remarkable object, a planetary nebula, very bright, very large, round, very, very gradually, then very suddenly brighter in the middle, $19^s.0$ in diameter. It is figured in the *Phil. Trans.* 1833 as a circle, stippled without any details.

Lord Rosse (cited above), in 1850, figured the nebula as a circle filled in with details somewhat resembling the face of an owl, with hair-like projections round the margin; and between the years 1848 and 1874 records the particulars of forty-five observations which were made. In some of them both he and Dr. Robinson saw a faint star to the right of the central star, and suspected the existence of one or two other very faint stars, as well as a spiral shape, but he does not refer to the hair-like surroundings of the nebula.

The photograph, now projected on the screen, shows the nebula as an ellipse with the major axis in *north following to south preceding* direction: it measures about 203 seconds of arc

in length. The star in the centre is very conspicuous, and of about 15th magnitude ; but there is no other star anywhere in the nebula, though there are two very faint condensations of nebulosity near the *north preceding* margin. The nebula seems as if it consisted of two nebulous disks superposed : the first a complete circular plane of faint nebulosity upon which is superposed a broad ring of dense nebulosity of lesser diameter than the plane and leaving uncovered an elliptical space, in the centre, in the middle of which is placed the star already referred to.

The ring is not of equal breadth all round, but is widened on the *north following* and *south preceding* sides, and narrowed on the *south following* and *north preceding* sides ; there is an absence of structure in the nebulosity, and the photograph does not indicate any nebulous projections beyond the symmetrical outline of the nebula. The disappearance of the second star, seen both by Lord Rosse and Dr. Robinson, is remarkable.

Photograph of the Nebula $\text{H V } 46 \text{ Ursæ Majoris}$.

By Isaac Roberts, D.Sc., F.R.S.

The photograph of the nebula $\text{H V } 46 \text{ Ursæ Majoris}$, R.A. $11^{\text{h}} 5^{\text{m}} 22^{\text{s}}$, Decl. $56^{\circ} 15'$ north, was taken with the 20-inch reflector on 1895 April 20, with exposure of the plate during four hours, and the copy now presented is enlarged to the scale of 1 millimetre to 15 seconds of arc.

The nebula is N.G.C. No. 3556, G.C. No. 2318, *h* 831. Rosse, *Obs. of Neb. and Cl. of Stars*, pp. 92, 93.

Sir J. Herschel (G.C. 2318) describes the nebula as considerably bright, very large, very much extended in the direction 79° , pretty bright in the middle, resolvable.

Lord Rosse records seven observations made between 1850 and 1874, and calls it a curiously twisted nebula, a large faint and much mottled ray with three stars involved ; numerous stars involved ; but much uncertainty in his observations is frequently indicated.

The photograph, as will be seen on the slide now projected on the screen, shows the nebula as an ellipse viewed at an acute angle with its plane, the major axis being in the direction of *preceding* and *following* at an angle of 79° , as stated. Four well-defined stars of 14th to 16th magnitude are involved in the nebulosity, and, besides, there are six star-like condensations involved ; the nebulosity which forms the rings is much broken up into masses, and the nebula seems to be one of the class in which we might expect, within a comparatively short period, to detect changes taking place in its structure.

Photograph of the Cluster H VII 66, and of the Nebula H IV 75 Cephei. By Isaac Roberts, D.Sc., F.R.S.

The photograph of the cluster H VII 66 *Cephei*, R.A. $21^{\text{h}} 43^{\text{m}} 24^{\text{s}}$, Decl. $65^{\circ} 17'$ north, was taken with the 20-inch reflector on 1895 September 25, with an exposure of the plate during three hours, and the copy now presented is enlarged to the scale of 1 millimetre to 24 seconds of arc.

The cluster is N.G.C. No. 7142, G.C. No. 4709, *h* 2134. Rosse, *Obs. of Neb. and Cl. of Stars*, p. 163.

It is described by Sir J. Herschel (G.C. 4709) as considerably large, considerably rich, pretty compressed, stars 11th to 14th magnitude.

The photograph is in agreement with the general descriptions given, and, in addition, shows each star in the cluster in true relative position and magnitude down to about the 17th. The chief use of the photograph will be as a reliable record for future comparison of the stars in the cluster and in the surrounding region of the sky.

Photograph of the Nebula H IV 75 Cephei.

The photograph of the nebula H IV 75 *Cephei*, R.A. $21^{\text{h}} 40^{\text{m}} 34^{\text{s}}$, Decl. $65^{\circ} 37'$ north (epoch 1895), was taken with the 20-inch reflector on 1895 September 25, with exposure of the plate during three hours, and the copy now presented is enlarged to the scale of 1 millimetre to 24 seconds of arc.

The nebula is N.G.C. No. 7129, G.C. No. 4702, *h* 2131. Rosse, *Obs. of Neb. and Cl. of Stars*, p. 162.

Sir J. Herschel (G.C. 4702) describes the nebula as a remarkable object, considerably faint, pretty large, gradually brighter in the middle, with three stars involved.

The photograph shows the nebula to be elliptical, measuring $432''$ in *north following* to *south preceding* direction, and $285''$ in *south following* to *north preceding*. The nebulosity is dense on the *north following* side, and involved in it, as a nucleus, are the three stars referred to by Sir J. Herschel: two of them are of about 12th magnitude and the third 16th magnitude. There are also eleven other stars, ranging between the 12th and 17th magnitudes, apparently involved in the nebula. The character of the nebulosity is flocculent with extensive dark areas, but there is some structure visible near the *north following* margin.

There are three stars, each of about 13th magnitude, surrounded by very faint nebulosity in the positions following, measured from the centre of the tristar nucleus of the nebula: (1) $358''$ *north following*; (2) $326''$ *north preceding*; (3) $277''$ *north preceding*. The stars Nos. 2 and 3 are not referred to in Dr. Dreyer's catalogues, and the measurements given above are approximate.